Effect of Package Type and Storage Duration on TBA Values of Shredded Eel

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Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh jenis kemasan dan lama penyimpanan pada suhu ruang terhadap mutu abon ikan sidat (Anguilla sp.) khususnya pada TBA (Thiobarbituric acid). Penelitian utama menggunakan metode eksperimen (Experimental Method) khususnya nilai TBA dengan menggunakan Rancangan Acak Lengkap (RAL) faktorial 3 × 4 dan 2 kali ulangan. Nilai TBA abon ikan sidat selama penyimpanan meningkat. Hasil analisis nilai TBA abon ikan sidat dengan penggunaan kemasan berbeda selama penyimpanan memberikan pengaruh yang sangat nyata terhadap peningkatan nilai TBA. Nilai TBA tertinggi pada abon ikan sidat selama penyimpanan hingga 56 hari adalah TBA pada toples plastik sebanyak 0,3849 mg/kg dan yang terendah pada kemasan plastik vakum sebanyak 0,1439 mg/kg.

This study aims to determine the effect of the type of packaging and storage time at room temperature on the quality of shredded eel (Anguilla sp.) Especially in TBA (Thiobarbituric acid). The main research used the experimental method. Especially to determine the TBA value using a Completely Randomized Design (CRD) 3 × 4 factorial and 2 replications. TBA value of shredded eel during storage increased. The results of the analysis with the use of different packages during storage have a very significant effect on the increase in TBA values. The highest TBA value in eel shredded for up to 56 days storage was TBA in plastic jars of 0.3849 mg / kg and the lowest in vacuum plastic packaging of 0.1439 mg / kg.

Keywords: packaging; storage time; shredded; eel; Anguilla sp.; TBA; Thiobarbituric acid

Introduction

Eel (Anguilla sp.) is a type of fish that have potential as an export commodity in international markets such as Japan, Hong Kong, Netherlands, Germany, and Italy. In Indonesia, the eels are found in areas bordering the sea such as southern coast of Java, Sumatra's west coast, the east coast of Borneo, Sulawesi coast, coastal islands of Maluku and West Papua. Unlike in other countries (Japan and European countries), in Indonesia eel fish resources have not been used, but these wild fish is abundant for consumption as well as for seedling (Budi, 2011).

Eel contains DHA (Decosahexaenoic acid, a substance required for the growth of children) as much as 1,337 mg / 100 g while salmon is only 748 mg / 100 g. The content of EPA (Eicosapentaenoic acid) contained in eel of 742 mg / 100 g while salmon is only 492 mg / 100 grams (Budi, 2011).

Table 1 Composition of fish meat Anguilla sp.

Component	Anguilla japonica	Anguilla bicolor	Anguilla
Protein	1 6 8	18.7 0-2 0, 32	1 7 5-2 1, 5
Fat	12.4	7.23 to 8, 11	3.3 to 9, 5
Water	69, 6	67, 79-7 0, 73	7 1, 5- 75.9
Ash	1.2	2, 69-3.2 0	1, 0-1, 6
Fiber	-	0, 73-0, 77	-

Source: FAO (1972), Rahman (1997), in Budi (2011)

Eel has a snake-like shape, causing poor appetite in the community. To change the image by using eel's high protein and to increase the selling price of the eels can be processed into refined products such as smoked eel, eel sausage, jerky shredded eel and eel (Budi, 2011).

Shredded fish is a product processed fishery products made from fish meat, through a combination of processing is the process of steaming, milling and frying

pan with the addition of spices. Shredded fish including dried processed products, in making use of materials include oil, coconut milk and spices that are sensitive to air, prone to rancidity during storage. Although the pressing is done to get rid of its oil, but not all of them can be eliminated. (Tridiyani, 2012)

During storage, shredded fish will still be severely degraded due to chemical and physical changes that occur in shredded during storage. As stated by Sudarmadji et al (2003) that during storage, food products containing fats or oils normally will undergo a process of rancidity during the storage process.

Storage process is an activity that is done to resist or delay of goods before the goods are used without changing the shape of the goods. In order for products such as shredded eel can be durable to be stored, then the need for packaging (Winarno and Laksmi in Wigati, 2009).Packaging is a container or media used for the packing material or commodities before being stored for easy setup, transport, placement in storage, as well as provide protection to materials or commodities (Imdad and Nawangsih, 1999)

According to Purwaningsih (1999), shredded fish are foods flavored processed fish, processed by boiling and frying. The resulting product has a soft shape, taste delicious, distinctive smell, and have a relatively long shelf life. Karyono (1982), in Lubis (2010), states, shredded fish product is processed fishery products made from fish meat, through a combination of process of grinding, frying, drying by means of frying, and the addition of auxiliary materials and flavoring to fish.

Research Methodology

The research was conducted from February to April in 2013 in the Laboratory of Development and Fishery Products Quality Testing (LPPMHP) Gorontalo Province, in the Quarantine Station Class I Gorontalo, and in the Laboratory of Chemistry Department, Faculty of Mathematics and Science, State University of Gorontalo.

The tools used for the manufacture of shredded eel products are: pots, pans, stove, basins, trays, cutting boards, spoons, stirrers, forks, smoothing, knives and tools pres shredded. The tools used for testing TBA among other analytical balance, blender, distillation flask, pipettes and test tubes.

Materials used for the manufacture of shredded eel is eel, water, coconut milk, cooking oil and spices, among others, salt, onion, garlic, ginger, sugar, coriander, bay leaf. Materials used for testing samples TBA include shredded eel, distilled water, clean water, 90% glacial acetic acid, and HCl.

In principle, TBA can react with malonaldehyde forming red color. The red color's intensity can be measured on a spectrophotometer. Thiobarbituric acid count is performed to determine the occurrence of rancidity by measuring the levels of malonaldehyde formed. TBA reagents were used as much as 0.2883 g/100 ml of glacial acetic acid 90%. The steps of the test that weighed as much as 10 gram sample thoroughly, then put in a blender, then add 50 ml of distilled water and crushed for 2 minutes. Samples were destroyed quantitatively transferred into a distillation flask while washed with 47.5 ml of distilled water. Then added 2.5 ml of HCl 4M (or until the pH become 1.5). The sample is distilled using upright cooler (distillation apparatus) to obtain a liquid distillate by 50 ml for 10 minutes of heating. Distillate obtained is stirred until homogeneous and pipetted into a test tube with a lid as much as 5 ml. TBA reagent is added about 5 ml then vortexed until homogeneous. The sample solution is heated in boiling water for 35 minutes and then cooled with running water for 10 minutes.

The reference solution is made by using 5 ml of distilled water and 5 ml of reagent in the same manner as the determination of the sample. The reference solution is used as the zero point in the absorbance measurements is the wavelength of 528 nm. TBA numbers are defined as mg malonaldehyde per kg sample.

Data analysis techniques in the study using statistical analysis, performed on the test data value TBA. The research data analysis model to value TBA shredded eel using statistical analysis completely randomized design (CRD).

If the results of testing the TBA value in shredded eel show the effect then the least significant difference (LSD) test is performed.

Results and Discussion

TBA level difference calculation results can be seen in Figure 1.

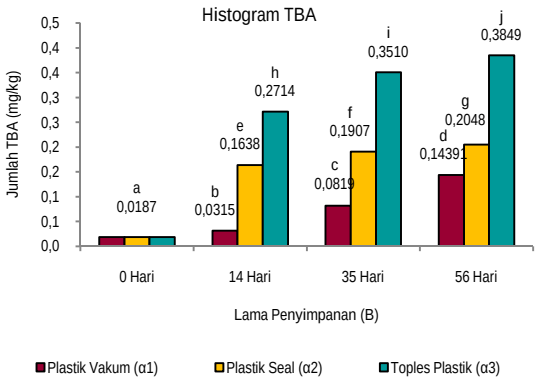

Figure 1 The influence of packaging on indigo TBA on shredded eel

The average number of TBA in shredded eel (Angguilla sp) on all packaging overall increased TBA values during storage and this signifies that the shredded products undergo rancidity during storage. The highest TBA value on shredded eel during storage up to 56 days is TBA in a plastic jar as much as 0.3849 mg / kg and the lowest in plastic vacuum packs as much as 0.1439 mg / kg. TBA value restrictions on food products by the FDA (Food Drug Administration) US in Kurade and Baranowski (1987) is a maximum of 1,286 mg malonaldehyde / kg of material. Based on these limits then shredded on all kind of plastic packaging vacuum, plastic seal, and plastic jars on storage for 56 days still qualify.

To determine the effect of packaging on the quality of chemical use shredded eel during storage, the analysis of variance on the TBA test shredded eel (Appendix 2). The calculation results of analysis of variance showed that the value of TBA shredded eel with the use of different types of packaging namely plastic jars, vacuum packaging, and plastic seals very significant effect on the value of TBA in shredded eel. TBA value shredded eel by factors types of packaging (), long storage (B), and the interaction between the type of packaging with storage time (B) obtained results that were significantly different.

Results of further testing with test least significant difference (LSD) (Annex 3) to factor in the type of packaging (), the value of TBA shredded in a plastic jar packaging highly significant with a value of TBA in vacuum packing and plastic seals. Similarly, the value of TBA shredded on vacuum packaging highly significant with TBA value on the plastic seal.

The LSD for storage time factor (B) against TBA values significantly different (level 1%). TBA values during storage 0 days highly significant with the TBA value storage 14, 35, and 56 days. TBA values during the 14-day storage highly significant with shredded TBA value at 35 and 56 days of storage. TBA values during 35 days of storage had highly significant with a value of TBA in storage for 56 days. Further test results for different interactions are not real shredded TBA value of the three types of packaging at 0 days of storage. Apart from that, the results obtained are significantly different and significantly different.

Conclusion

Results of the analysis on shredded eel, using different packaging during storage, show effect on the value of TBA. According to the standard of FDA (Food Drug Administration), the limit of the maximum TBA value is 1,286 mg malonaldehyde in each kg of material. The shredded eel on a plastic vacuum packs, plastic seal, and plastic jars for storage of 56 days is still qualified.

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